

## REMARKS

Claims 8-13 and 18-21 are pending in the application. The rejection of Claim 21 under 35 U.S.C. § 112 as depending from a canceled claim is respectfully traversed. Claim 21 has been amended to depend from independent Claim 18. The basis for the § 112 rejection is therefore eliminated.

The rejection of Claims 18-21 under 35 U.S.C. § 102(b) as being anticipated by, or, in the alternative, under 35 U.S.C. § 103(a) as obvious over, Canadian Patent No. 1,134,564 (hereinafter the Canadian patent) is respectfully traversed. Claim 18 and Claims 19-21 depending therefrom are directed to a process for treating a cellulose fiber product with a biocidally effective amount of a water soluble copper salt. This process produces a fiber product containing 0.01-0.25% of copper salt that is resistant to fiber length degradation during refining and that requires significantly less refining energy than prior art fibers treated with larger amounts of soluble copper salts.

By way of background, cellulose fibers are used as a filler and reinforcing material for cement fiber boards. In order for the fibers to be used in cement fiber boards, they are typically refined to separate the fibers from one another prior to introduction into the sedimentitious material used to produce the fiber boards. Such cellulose fibers have, in the past, been treated for fungal resistance with heavy metal biocides, such as copper sulfate, DDAC, or DDAB. Prior to introduction of fibers into the cementitious material utilized to make the fiber board, the cellulose fibers are subjected to a refining process, which is a mechanical process that singulates or separates the fibers from one another. It has been found, however, that cellulose fibers treated with what was heretofore considered to be biocidally effective amounts of, for example, copper sulfate, DDAC, or DDAB, have required significantly higher energy input for refining and are also subject to considerable degradation during the refining process. The applicants herein have

LAW OFFICES OF  
CHRISTENSEN O'CONNOR JOHNSON KINDNESS<sup>PLC</sup>  
1420 Fifth Avenue  
Suite 2800  
Seattle, Washington 98101  
206.682.8100

found that the use of a relatively small amount of copper salt (from 0.01-0.25%) and/or DDAC, DDAB, or mixtures thereof (from 0.1-2.0%) is surprisingly still biocidally effective against fungi, while significantly reducing the refining energy required to singulate the fibers, and quite surprisingly, without significantly reducing the fiber length degradation of the fibers during refining.

Applicants have defined this invention in independent Claim 18 as a process for making cellulose fiber product containing 0.01-0.25% by weight of a copper salt. The fiber product is resistant to fiber length degradation during refining. This invention is neither disclosed nor rendered obvious by the Canadian patent.

The Examiner contends that the Canadian patent discloses copper sulphate as a biocide (page 3, line 4 and the Table on page 18, Fiber (1)), by the addition of 0.65% "Boliden K33," which comprises 14.8% copper salt. The Examiner computes that this converts to 0.1% copper salt added to the fiber. The standard for anticipation of a patent is one of strict identity. "... anticipation requires that all of the elements and limitations of the claim are found within a single prior art reference." *Scripps Clinic & Research Foundation v. Genentech, Inc.*, 927 F.2d 1565, 1576, 18 U.S.P.Q.2d 1001, 1010 (Fed. Cir. 1991). Thus, a reference anticipates an invention if a person of ordinary skill in the art would view the claimed invention and the subject matter disclosed in the reference as one and the same. Applicants' Claim 18 is limited to a copper salt in the amount of 0.1-0.25% in the fiber. This range is not identically disclosed in the Canadian patent. Therefore, the Canadian patent cannot anticipate Claim 18, or the claims depending therefrom.

Similarly, the claimed invention is not rendered obvious by the Canadian patent. Section 103 of the Patent Laws requires that an invention must not have been "obvious at the time the invention was made to one of ordinary skill in the art to which the subject matter of the

LAW OFFICES OF  
CHRISTENSEN O'CONNOR JOHNSON KINDNESS<sup>PLC</sup>  
1420 Fifth Avenue  
Suite 2800  
Seattle, Washington 98101  
206.682.8100

invention pertains." 35 U.S.C. § 103(a). In the landmark 1966 case of *Graham v. John Deere*, 383 U.S. 1, 148 U.S.P.Q. 459 (1966), the Supreme Court ruled that in determining § 103 nonobviousness, the courts and the Patent and Trademark Office should make "several basic factual inquiries," namely, (1) the scope and content of the prior art, (2) the differences between the prior art and the claims at issue, and (3) the level of ordinary skill in the pertinent art. *Id.* at 17. The *Graham* court also noted that several secondary considerations were relevant in such a nonobviousness determination, namely, the commercial success of the invention, the existence of a long-felt, but unresolved, need met by the invention, and the failure of others to arrive at a similar invention. Unexpected results are also objective criteria of nonobviousness. *In re Margolis*, 785 F.2d 1029, 228 U.S.P.Q. 940 (Fed. Cir. 1986).

The differences between applicants' invention and that disclosed in the Canadian patent are significant. First, applicants only employ a very small amount of a copper soluble salt, that is, from 0.01-0.25%, well below any amount disclosed by the Canadian patent. Secondly, applicants have unexpectedly found that the fiber treated with this amount of copper salt is resistant to fiber length degradation during subsequent refining. See the test results in Table 5, page 4, of applicants' published specification ('983 A1). There is nothing in the Canadian reference that suggests or even hints to one of ordinary skill in the art that fibers resistant to fiber length degradation during refining can be achieved by employing a very small, yet biocidally effective, amount of a copper sulfate.

In order for the Examiner to establish a *prima facie* case of obviousness, the prior art relied upon, in this case the Canadian patent, coupled with the knowledge generally available in the art at the time of the invention, must contain some suggestion, motivation, to one of ordinary skill to modify a reference or, for that matter, to combine the prior art reference with another prior art reference. *See Karsten Manufacturing Corp. v. Cleveland Golf Co.*, 242 F.3d 1376,

LAW OFFICES OF  
CHRISTENSEN O'CONNOR JOHNSON KJNDNESS<sup>PLC</sup>  
1420 Fifth Avenue  
Suite 2800  
Seattle, Washington 98101  
206.682.8100

1385, 58 U.S.P.Q.2d 1286, 1293 (Fed. Cir. 2001); *CR Bard, Inc. v. M3 Sys., Inc.*, 157 F.3d 1340, 1352, 48 U.S.P.Q.2d 1225, 1232 (Fed. Cir. 1998); and *In re Vaeck*, 947 F.2d 488, 20 U.S.P.Q.2d 1438, 1442 (Fed. Cir. 1991). Further, in order to establish a *prima facie* case of obviousness, the proposed modification of the prior art must have had a reasonable expectation of success. In other words, a hindsight analysis is not allowed. *See, for example, Amgen, Inc. v. Chugai Pharm. Co.*, 927 F.2d 1200, 18 U.S.P.Q.2d 1016, 1022 (Fed. Cir. 1991). Finally, the prior art reference or combination of references must teach or suggest all of the limitations of the claims. *See In re Wilson*, 424 F.2d 1382, 165 U.S.P.Q. 494, 496 (C.C.P.A. 1970).

Here, the Examiner has failed to establish a *prima facie* case of obviousness because there is no suggestion in the prior art (a) to employ the claimed small amount of copper salt and (b) that this amount of copper salt will still retain its biocidal effectiveness while providing a cellulose fiber that is resistant to fiber length degradation during subsequent refining. This result is unexpected and therefore unobvious. *See In re Margolis, supra*. Claims 18-21 are therefore clearly patentable over the art of record.

Claims 18-21 have also been rejected under 35 U.S.C. § 103(a) as being unpatentable over the Canadian patent with or without Nicholas et al., U.S. Patent No. 5,462,589 (hereinafter Nicholas et al.).

The Examiner again has failed to establish a *prima facie* case of obviousness. To reiterate, there is nothing in the Canadian patent that suggests using a small but yet biocidally effective amount of a copper salt will result in a cellulose fiber that is not subject to fiber degradation during the refining. The arguments presented above apply to this rejection as well.

The Examiner asserts that the use of 0.25% copper salt is taught by Nicholas et al. While Nicholas et al. teaches that varying amounts of copper salt are biocidally effective, the teaching of Nicholas et al., on the whole, teaches away from applicants' invention. The Examiner

LAW OFFICES OF  
CHRISTENSEN O'CONNOR JOHNSON KJNDNESS<sup>PLC</sup>  
1420 Fifth Avenue  
Suite 2800  
Seattle, Washington 98101  
206.682.8100

suggests that Nicholas et al. describes test results showing biocidal effectiveness of a copper compound at a concentration of 53 ppm in Table 1. However, this test is *not* conducted in the presence of wood, but only in an agar nutrient solution. See Nicholas et al., Col. 6, line 9, *et seq.* Interestingly, however, when Nicholas et al. tested the copper on wood in the presence of *P. placenta*, the solution provided "... no protection, even at the highest treatment level of 0.778 pcf." See Nicholas et al., Col. 9, line 44, *et seq.* The treatment level of 0.778 pcf converts to a copper concentration of about 2.1% by weight, assuming a specific gravity of 0.51 (the specific gravity of a common southern pine, Loblolly pine). In other tests, it was noted that at low concentrations (0.091 pcf) of 0.28%, protection was not offered against *G. trabeum*. See Nicholas et al., Col. 7, line 64, *et seq.*

Thus, Nicholas et al. teaches away from applicants' achievement of biocidal effectiveness on pulp fibers that do not suffer length degradation during refining when treated with 0.01-0.25% copper salt. Neither the Canadian patent nor Nicholas et al. discloses, suggests, or even hints at applicants' unexpected results. Applicants' claimed invention is therefore unobvious to one of ordinary skill. *See In re Vaeck, supra*, and *See In re Margolis, supra*.

The Examiner's rejection of Claims 8-13 under 35 U.S.C. § 103(a) as being unpatentable over the Canadian patent as applied to Claim 18 further in view of Huth et al., U.S. Patent No. 5,049,383 (hereinafter Huth et al.), or Schultz et al., U.S. Patent No. 5,730,907 (hereinafter Schultz et al.) is respectfully traversed. Claim 8 and the claims depending therefrom are directed to a process for treating a cellulose fiber product so that it is resistant to biological degradation. The treatment process treats the fiber so that it contains a biocidally effective amount of 0.1-2.0% by weight of dry fiber of a compound selected from didecyldimethylammonium chloride (hereinafter DDAC), didecyldimethylammonium bromide (hereinafter DDAB) and mixtures thereof. The resulting fiber is resistant to fiber length degradation during refining and also

LAW OFFICES OF  
CHRISTENSEN O'CONNOR JOHNSON KINDNESS<sup>PLLC</sup>  
1420 Fifth Avenue  
Suite 2800  
Seattle, Washington 98101  
206.682.8100

requires significantly less refining energy than fibers containing larger amounts of the same compound.

Claim 8 is rejected as obvious over the Canadian patent as applied to Claim 1, further in view of Huth et al. or Schultz et al. The Examiner asserts that Huth et al. or Schultz et al. teaches the use of DDAC and/or DDAB as effective biocides to protect wood from biodegradation. He asserts that it would have been obvious to use the biocide of Huth et al. or Schultz et al. as a substitute for the copper salt of the Canadian patent. The Examiner again has failed to set forth a *prima facie* case of nonobviousness.

Applicants are not disputing that DDAC and DDAB are known biocides for use in the preservation of wood. Applicants' invention is not the application of DDAC or DDAB to wood *per se*, but to cellulose fibers in a specific amount ranging from 0.1-2.0%. This amount of DDAC or DDAB not only functions as a biocide at those low percentages, but provides a fiber that can still be refined at low refining energies and a fiber *that is resistant to fiber length degradation when refined*. Tables 5 and 6 of applicants' published specification show that refining energy required to refine fiber containing from 0.2-1% DDAC is approximately the same as that required for untreated fiber, that is, on the order of about 2640 MJ/T. Similarly, the length of the treated fiber after refining is not significantly affected when compared with an untreated fiber. This is a clearly surprising result in view of the fact that biocides normally result in significant fiber length degradation. Thus, applicants' have achieved a surprising result when incorporating a biocidally effective amount from 0.1-2% of DDAC and/or DDAB, that is, the fiber does not suffer length degradation during the refining process.

Again, there is no disclosure, suggestion, or even hint, in the Canadian patent, Huth et al., or Schultz et al., that utilizing DDAC and DDAB within the claimed range will surprisingly result in a fiber that will not suffer length degradation during refining. The Examiner has,

LAW OFFICES OF  
CHRISTENSEN O'CONNOR JOHNSON KINDNESS<sup>LLC</sup>  
1420 Fifth Avenue  
Suite 2800  
Seattle, Washington 98101  
206.682.8100

therefore, again failed to set forth a *prima facie* of nonobviousness. Claim 8 and the claims depending therefrom are therefore unobvious over the art of record. *See In re Vaeck, supra*, and *In re Margolis, supra*.

The rejection of Claims 9 and 11-13 under 35 U.S.C. § 103(a) as being unpatentable over the Canadian patent in view of Huth et al. or Schultz et al. as applied to Claim 18, with or without Nicholas et al. is respectfully traversed.

Claim 9 depends from Claim 8 and incorporates from 0.01-0.25% of water soluble copper salt into the cellulose fibers as well as the DDAC and DDAB recited in Claim 8. Further, Claim 19 adds DDAC, DDAB, or mixtures thereof, to the cellulose fiber of Claim 18 containing water soluble copper salt. Claims 9 and 19 are thus of similar scope, because they both combine the limitations of Claims 8 and 18, that is, both Claims 9 and 19 define a process for treating a fiber containing both copper salt *and* DDAC, DDAB, or mixtures thereof.

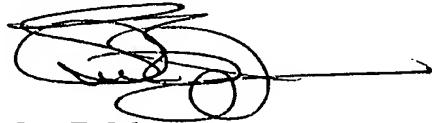
Again, the Examiner has not set forth a *prima facie* case of nonobvious. He has not shown that the references of record suggest or even hint at applicants' claimed invention, namely the use of a biocidally effective, small amounts of a copper salt and of DDAC, DDAB, or mixtures thereof, produce a cellulose fiber that is not subject to fiber length degradation during refining. Again, none of the references of record recognize applicants' invention that using small amounts of the recited biocides still retain biocidal effectiveness when applied to cellulose fiber, while surprisingly not altering the fibers to the extent that they suffer significant fiber length degradation during refining. See the test results set forth in Table 5, page 4, of applicants' published specification. Thus, applicants' Claims 9 and 11-13 are unobvious over the art of record. *See In re Margolis, supra*, and *In re Vaeck, supra*.

LAW OFFICES OF  
CHRISTENSEN O'CONNOR JOHNSON KINDNESS<sup>PLC</sup>  
1420 Fifth Avenue  
Suite 2800  
Seattle, Washington 98101  
206.682.8100

In view of the foregoing amendments and remarks, the Examiner is therefore respectfully requested to reexamine the application, to reconsider and withdraw the rejections of the claims, and to promptly allow the case and pass it to issue.

Respectfully submitted,

CHRISTENSEN O'CONNOR  
JOHNSON KINDNESS<sup>PLLC</sup>



Lee E. Johnson  
Registration No. 22,946  
Direct Dial No. 206.695.1701

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LAW OFFICES OF  
CHRISTENSEN O'CONNOR JOHNSON KINDNESS<sup>PLLC</sup>  
1420 Fifth Avenue  
Suite 2800  
Seattle, Washington 98101  
206.682.8100